What is Claimed is:

1. A telecommunication system having reduced crosstalk comprising:

a modem disposed at a customer premises;

a local loop terminating at the customer premises and connected to the modem, the local loop for carrying modem communications;

a first circuit disposed to sense the signal received on the local loop;

a second circuit configured to obtain a common mode signal from the local loop; and

a processor circuit disposed within the modem, the processor configured to reduce crosstalk on the local loop through computations based upon both the signal received on the local loop and the common mode signal.

2. The system of claim 1, wherein the processor circuit is more specifically configured to cancel NEXT crosstalk.

3. The system of claim 1, wherein the telecommunication system is a digital subscriber line DSL system and the modem is a DSL modem.

4. The system of claim 1, wherein processor circuit is configured to compute equations in the following form:

$$p[n] = (f \otimes u)[n] + (k \otimes e)[n] + w[n], \text{ and}$$

$$r[n] = (h \otimes e)[n] + (g \otimes u)[n] + v[n],$$

where $w[n]$ and $v[n]$ are independent white noise quantities, $r[n]$ is the signal received on the local loop, $p[n]$ is the common mode signal , $h[n]$ is an impulse response of the first local loop, $k[n]$ is a cross-coupling measure between the emitted differential signal and the common mode, $u[n]$ is a signal carried on a disturber line, $f[n]$ is a cross-coupling measure between the disturber line and the common mode signal, $e[n]$ is the signal transmitted from a remote transmitter on the local loop, $g[n]$ is a cross-coupling measure between the disturber line and the local loop, and wherein the $\otimes$ symbol represents a convolution operation.

5. The system of claim 4, wherein the processor is configured to approximate the first equation of claim 4 to be:

$$p[n]=(f \otimes u)[n] + w[n]$$

by assuming that the FEXT term $(k \otimes e)[n]$ is very small in comparison to the NEXT term $(f \otimes u)[n]$.

6. The method of claim 4, wherein the processor is configured assume that $(k \otimes e)[n]$ term is not negligibly small compared to the NEXT $(f \otimes u)[n]$ term, and the processor is configured to utilize source separation methods for computing the equations of claim 4.

7. The system of claim 6, wherein the source separation methods include using a blind source separation mathematical technique.

8. The system of claim 6, wherein the source separation methods include using a semi-blind source separation mathematical technique.

9. The system of claim 5, wherein the processor is configured to approximate the second equation of claim 4 to be:

$$r[n]=(h \otimes e)[n]+(\xi \otimes p)[n]+ \eta[n]$$

where $\xi[n]$ denotes an equivalent coupling, and $\eta[n]$ denotes a white noise.

10. The system of claim 9, wherein the processor is further configured to compute $\xi[n]$ during a silent phase where $e[n]=0$, since $p[n]$ and $e[n]$ are substantially uncorrelated.

11. The system of claim 9, wherein the processor is further configured to compute $\xi[n]$ using a minimum means square deconvolution method.

12. The system of claim 9, wherein the processor is further configured to compute $\xi[n]$ using an adaptive filtering method.

13. The system of claim 1, wherein the processor is implemented in circuitry.

14. The system of claim 13, wherein the processor circuitry includes hardware.

15. The system of claim 13, wherein the processor circuitry includes software.

16. The system of claim 13, wherein the processor circuitry includes a combination of hardware and software.

17. The system of claim 13, wherein the processor circuitry includes firmware, micro-coded into hardware.

18. In a telecommunications system having a local loop terminating at a customer premises, a method of reducing crosstalk on the local loop comprising the steps of:

sensing a first signal received on the local loop;

obtaining a common mode signal from the local loop;

using the first signal and the common mode signal to compute a measure of crosstalk present on the first local loop; and

subtracting the measure of crosstalk from the first signal.

19. The method of claim 18, wherein the step of using the first signal and the common mode signal to compute a measure of crosstalk includes solving equations in the following form:

$p[n] = (f \otimes u)[n] + (k \otimes e)[n] + w[n]$, and

$$r[n] = (h \otimes e)[n] + (g \otimes u)[n] + v[n],$$

where $w[n]$ and $v[n]$ are independent white noise quantities, $r[n]$ is the signal received on the local loop, $p[n]$ is the common mode signal , $h[n]$ is an impulse response of the first local loop, $l[n]$ is a cross-coupling measure between the local loop and the common mode, $u[n]$ is a signal carried on a disturber line, $f[n]$ is a cross-coupling measure between the disturber line and the common mode signal, $e[n]$ is the signal transmitted from a remote transmitter on the local loop, $g[n]$ is a cross-coupling measure between the disturber line and the local loop, and wherein the $\otimes$ symbol represents a convolution operation.

20. The method of claim 19, wherein the processor is configured to approximate the first equation of claim 4 to be:

$$p[n]=(f \otimes u)[n] + w[n]$$

by assuming that the term $(k \otimes e)[n]$ is very small in comparison to the NEXT term $(f \otimes u)[n]$.

21. The method of claim 19, wherein the step of solving the equations further includes the step of assuming that the $(k \otimes e)[n]$ term is not negligibly small compared to the NEXT $(f \otimes u)[n]$ term, and that source separation methods are utilized for computing the equations of claim 19.

22. The method of claim 21, wherein the source separation methods include using a blind source separation mathematical technique.

23. The method of claim 21, wherein the source separation methods include using a semi-blind source separation mathematical technique.

24. The method of claim 20, wherein the step of solving the equations further includes approximating the second equation of claim 19 to be:

$$r[n]=(h \otimes e)[n]+(\xi \otimes p)[n]+ \eta[n]$$

where $\xi[n]$ denotes an equivalent coupling, and $\eta[n]$ denotes a white noise.

25. The method of claim 24, wherein the step of solving the equations further includes computing $\xi[n]$ during a silent phase where $e[n]=0$, since $p[n]$ and $e[n]$ are substantially uncorrelated.

26. The method of claim 24, wherein the step of solving the equations further includes computing $\xi[n]$ using a minimum means square deconvolution method.

27. The method of claim 24, wherein the step of solving the equations further includes computing $\xi[n]$ using an adaptive filtering method.

28. In a telecommunications system having a local loop terminating at a customer premises, a method of reducing the effects of crosstalk on the local loop comprising the steps of:

sensing a first signal received on the local loop;

obtaining a common mode signal from the local loop;

using both the first signal and the common mode signal to compute a transmitted signal.

29. The method of claim 28, wherein the step of using the first signal and the common mode signal to compute a transmitted signal includes using a covariance matrix and statistical probabilities to approximate the transmitted signal.

30. In a customer premises, a modem having improved crosstalk cancellation circuitry for canceling crosstalk received on a local loop carrying modem communications comprising:

a first input for receiving a signal carried on the local loop;

a second input for receiving a common mode signal obtained from the local loop;

processing circuitry configured to reduce crosstalk present in the signal carried on the first local loop through computations based upon the signals carried on both the first signal and the common mode signal.

31. The modem of claim 30, wherein the signal carried on the local loop is a digital subscriber line (DSL) signal.